REMARKS

Please reconsider the application in view of the above amendments and the following remarks. Applicants thank the Examiner for carefully considering this application.

Applicants respectfully reassert that a "carbon alloy" is a unique formation of carbon that has more than one type of carbon covalent bonding. As a starting point of understanding Applicants' invention as claimed in this application is the unique concept of a "carbon alloy" defined in the literature as follows:

> "Carbon alloys are materials mainly composed of carbon atoms in multi-component systems, in which each component has physical and/or chemical interactions with each other. Here, carbons with different hybrid orbitals account for different components." *CARBON ALLOYS, Novel Concept to Develop Carbon Science and Technology*, Yasuda et al., at page 9 (2003), [IDS REF. B9].

It is noted in this definition that Applicants' define a product by a process for making the and that the product claimed is a carbon alloy that was mentioned in the Yasuda et al., book, *CARBON ALLOYS, Novel Concept to Develop Carbon Science and Technology*, as a theoretical concept. Applicants have disclosed how to make such a product and in Claims 31-72 that are under consideration in this application Applicants have claimed such a product in terms of the process for making it. It is respectfully submitted that the process as set forth in the claims results in a product that was not previously shown in any of the prior art asserted in the Office Action.

As further background for understanding the arguments made by Applicants that the product resulting from the process of the claims is different from the products of the

art cited in the Office Action, a word about carbon bonding may be helpful. In carbonaceous materials (i.e., materials that have carbon bonded with other elements such as hydrocarbon, alkanes, alkenes, polymers, etc.), the covalent carbon bonds are formed of various hybrid orbitals that may be sp (an atomic *s* orbital of carbon hybridized with two of the atomic *p* orbitals of carbon), sp^2 (an atomic *s* orbital of carbon hybridized with two of the atomic *p* orbitals of carbon), or sp^3 (an atomic *s* orbital of carbon hybridized with three atomic *p* orbitals of carbon.)

In graphite, there is only one type of hybrid orbital carbon-carbon bonding. Applicants claim a carbon alloy and by the definition set forth above, carbon alloys are "materials mainly composed of carbon atoms in multi-component systems, in which each component has physical and/or chemical interactions with each other. Here, carbons with different hybrid orbitals account for different components." Because all of the carbon hybrid orbital bonding in graphite is the same type there are no "different hybrid orbitals accounting for different components." Thus, the formation of graphite does not result in the same product as claimed by applicants. All of the carbon-carbon bonding in graphite is made of sp^2 hybrid orbitals. To further clarify that the product claimed by applicants is not graphite, applicants have amended the two independent claims under consideration , namely claims 31 and 61, to specify that the source materials are not graphite and because the process is conducted below 1300 °C (the temperature at which graphite formation is initiated) the product claimed is also not graphite.

Correction of Prior Unintentional Error.

At this point an inadvertent error and thus an unintended misstatement might have been considered by the examiner in an earlier preliminary amendment filed on January

12, 2009, together with the request for the RCE in this case. In that preliminary amendment, Applicants through their attorney argued to distinguish the previously asserted Zondolo et al. patent and product as being graphite having a single type of bonding. That is correct. However, inadvertently the hybrid orbital bonding in graphite was mistyped and asserted to be ell known as"**sp^3**" hybrid orbital and that should have been typed as **sp^2**. The effect of the argument is deemed correct that graphite, and thus the Zondolo et al. graphite product, have a single type of hybrid orbital bonding, however the type was inadvertently in error. It is respectfully submitted that the error in the designation of the single type of hybrid bond in graphite will be understood by those skilled in the art and, it is expected that the examiner will recognize this as well. To the extent that this error was considered by the examiner in not maintaining the rejection based upon Zondolo et al., applicants respectfully request that the examiner reconsider the matter with the corrected information and in view of the amended claims. It is believed that the single hybrid orbital in the Zondolo et al. product and the fact that Zondolo et al. is directed to a graphite product shows that product to be different from Applicants' claimed product. The different hybrid orbitals required in a carbon alloy in as claimed, indicates that the claimed product is distinct on that basis and is deemed patentable.

Present Remarks Continued

Carbon alloys have multiple carbon components and the components are considered as carbons with different hybrid orbital bonding. For example, multiple component carbon combinations might include (sp and sp2), (sp and sp3), (sp2 and sp3), or (sp and sp2 and sp3). Normally, a given carbonaceous material will have among the

carbon bonds, hybrid orbital bonds formed by primarily one or another of the various kinds of hybrid orbitals. In the form of carbon defined as graphite, all the hybrid orbital carbon bonds are sp^2.

It should be noted that graphite is a unique form of carbon where the hybrid bonds between multiple carbon atoms are arranged in a planes or plates of carbon bonded in a hexagonal lattice structure, one atom thick. The plates that form graphite are sometimes referred to by the term graphene. In three-dimensional graphite having a thickness of more than only a few atoms thick, multiple graphene plates are formed and are arranged parallel to each other, at least in discrete locations, to form different size structures of graphite. The planar orientation of the graphite structures may be randomly oriented relative to each other in a given quantity of graphite material. In some cases, as shown in the prior art cited by the examiner, efforts and processes are employed attempting to reduce the randomness and to obtain a higher degree of parallel oriented graphite, sometimes referred to as obtaining a higher degree of graphitization. When a plurality of graphene planes are parallel and in close proximity in graphite, the atomic interaction between the grapheme planes is due to van der Waal forces; this is not hybrid orbital bonding. Because valance electron sharing or overlapping in hybrid orbitals is not present between the layers of grapheme planes, the plates can slip and slide relative to each other upon application of physical force. All hybrid orbital bonds between carbon atoms in graphite are designated sp^2 hybrid orbital bonds. It might also be understood that hybrid orbitals are in the form of sigma covalent bonds formed directly between the atoms. When there are sp^2 hybrid orbital bonds between carbon atoms there may also be unfilled or unsaturated atomic p orbitals that allow the formation of pi bonds (adjacent to

and not directly between the atoms) so that double bonds can result. In the case of graphite, carbon atoms that are sp^2 hybrid bonded to each other, also present atomic p orbitals that can further results in pi bonding (not hybrid orbital bonding) and in graphene this has been termed delocalized pi bonding that is in addition to the sp^2 hybrid orbital bonds. The atomic p orbitals that may result in pi bonds are not the same as hybrid orbitals. The unique bonding structure of graphite has only been known to be formed by the use of very high temperatures above about 1300 °C. In pure graphite only one type of hybrid orbital for carbon is present such that a product that is made only of graphite should not be considered as a carbon alloy. In particular, Applicants' claimed product by process as presently amended excludes source materials that are graphite and also requires temperatures below those known to be required to form graphite, such that Applicants' currently claimed product by process should be seen as different from the graphite based products of others formed with graphite based materials or those in which high temperatures result in the formation of graphite products.

It is respectfully submitted that scientific knowledge and literature indicates that the uniform single form of bonding in graphite is different from the multiple form of hybrid orbital bonding required for carbon alloys. Applicants claim a molded carbon alloy product and by the definition above such a product made by the process defining the product is "mainly composed of carbon atoms in multi-component systems, in which each component has physical and/or chemical interactions with each other. Here carbons with different hybrid orbitals account as different components." (See, CARBON ALLOYS, Novel Concept to Develop Carbon Science and Technology, Yasuda et al., at page 9 (2003), [IDS REF. B9]. Moreover, Applicants' product is a

molded three dimensional shaped product that should also be seen as different from vapor deposited film materials.

Disposition of Claims

Claims 31-72 are pending in this application and under consideration in this amendment. Claims 1-30 and 73-112 remain in this application and are currently withdrawn from consideration. Claims 31 and 61 are independent. The remaining claims under consideration 32-60 and claims 61-71 depend, directly or indirectly, from claims 31 and 61, respectively.

Claim Amendments

Claims 31, 61-72 have been amended in this reply. Support for these amendments to claim 31 can be found for example in the specification and in the dependent claims because the carbon containing feed materials listed as examples are not graphite containing materials. Support for the amendments to claims 61-72 can be found for example, in claim 31 as supported by the specification. Thus, these amendments are supported by the original specification and no new matter has been added.

Rejection(s) under 35 U.S.C § 102 or 35 U.S.C. § 103 over US Pat. No. 4213956, (Ubbelohde)

Claims 31-72 stand rejected under 35 U.S.C. § 102 as anticipated by or, in the alternative obvious under 35 U.S.C. § 103 over 4213956 (Ubbelohde.) Claims 31, 61-72 have been amended in this reply. To the extent that this rejection may still apply to the amended claims, the rejection is respectfully traversed.

For the following reasons, this rejection is respectfully traversed.

Carbon alloys have combinations of carbons with different hybrid orbital, for example (sp and sp^2), (sp and sp^3), (sp^2 and sp^3), or (sp and sp^2 and sp^3). A given carbon containing feed material can have among the carbon bonds, hybrid orbital bonds formed by various types of hybrid orbitals. Although there will typically be more of one type than another type of hybrid orbital bonds. In the molded carbon alloy product as claimed by Applicants there will be at least two types of hybrid orbital carbon bonding. The lists of feed source materials in the specification, in the examples and in some of the dependent claims are non-graphitic materials. The independent claims have been amended to clarify this characteristic. The process is conducted below the temperature of 1300°C, generally considered a the temperature for initiation of graphite formation, such that the product as claimed will be a non-graphite carbon alloy product that should be seen as different from the product of the cited reference.

Applicants respectfully disagree and hereby traverse the Examiner's assertion that the Examiner sees no difference in Applicants' product, one with a plurality of different hybrid orbital carbon bonding, and the graphite products of Ubbelohde in which both of the materials selected for making the product contain graphite and these are specifically selected for the graphite content and at every stage whether optional or not, the purpose is to produce a resulting product or material with graphite. Moreover, there is no indication that a plurality of hybrid orbital carbon bonding is intended, rather the intended product is aligned graphite. In the part of the process considered optional by the examiner, elevated temperatures are intended to be employed to obtain more complete graphitization. Thus, it is respectfully submitted that distinct differences exist between the product of

Ubbelohde and the molded carbon alloy as claimed by Applicants. Ubbelohde does not anticipate the claimed product and Applicants' claimed product would not have been obvious in view of Ubbelohde. Reconsideration and allowance of claims 31-72 are respectfully requested.

In view of the above, Ubbelohde fails to show or suggest the present invention as recited in the claims 31 and 61 as amended. Thus, the claims 31 and 61 as amended are patentable over Ubbelohde. Dependent claims are allowable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Rejection(s) under 35 U.S.C § 102 or 35 U.S.C. § 103 over US Pat. No. 3867499, (Morgan)

Claims 31-72 stand rejected under 35 U.S.C. § 102 as anticipated by or, in the alternative obvious under 35 U.S.C. § 103 over 4213956 (Morgan.) Claims 31 and 61-72 have been amended in this reply. To the extent that this rejection may still apply to the amended claims, the rejection is respectfully traversed.

For the following reasons, this rejection is respectfully traversed.

Applicants respectfully disagree and hereby traverse the Examiner's assertion that the Examiner sees no difference in Applicants' product, one with a plurality of different hybrid orbital carbon bonding, and the carbon fiber products of Morgan in which all of the source materials (acrylic polymer in a solvent) for making "high modulus carbon and graphite fibers" provides a single sp^2 type of hybrid carbon bonding. The product, even at intermediate stages, is not by definition a carbon alloy. The final product of Morgan is further intended to be heated to above about 1800°C. Whether at the initial stages or

after the heating stage, the resulting product will have a single type of sp^2 hybrid orbital carbon bonding in the resulting product. Thus, it is respectfully submitted that distinct differences exist between the product of Morgan and the molded carbon alloy as claimed by Applicants. Morgan does not anticipate the claimed product and Applicants' claimed product would not have been obvious in view of Morgan. Reconsideration and allowance of claims 31-72 are respectfully requested.

In view of the above, Morgan fails to show or suggest the present invention as recited in the claims 31 and 61 as amended. Thus, the claims 31 and 61 as amended are patentable over Morgan. Dependent claims are allowable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Rejection(s) under 35 U.S.C § 102 or 35 U.S.C. § 103 over Tither et al., article, (Tither)

Claims 31-72 stand rejected under 35 U.S.C. § 102 as anticipated by or, in the alternative obvious under 35 U.S.C. § 103 over 4213956 (Tither.) Claims 31 and 61-72 have been amended in this reply. To the extent that this rejection may still apply to the amended claims, the rejection is respectfully traversed.

For the following reasons, this rejection is respectfully traversed.

In Tither the resulting product was mainly graphitic with only some sp3 boding present. The intent was to obtain a thin film deposition of graphite (sp2) and the resulting film had only a small part of sp3 bonding present in the film. Initially, it is respectfully submitted that this is not a non-graphite carbon alloy according to Applicant's claim and on that basis should not be considered as the same product claimed by Applicants.

Moreover, the Examiner appears to assert without support that a deposited film can be considered a molded product. If this assertion is based upon official notice by the Examiner's own personal knowledge then Applicants respectfully request an affidavit by the Examiner supporting that assertion under 37 CFR 104(d)(2). According to Applicants' claim 31, the claimed product is characterized as "a molded non-graphite carbon alloy" made at temperatures below 1300°C, thereby eliminating the formation of graphite, and a film primarily of graphite is not the same product as claimed by Applicants.

In view of the above, Tither fails to show or suggest the present invention as recited in the claims 31 and 61 as amended. Thus, the claims 31 and 61as amended are patentable over Tither. Dependent claims are allowable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Rejection(s) under 35 U.S.C § 102 or 35 U.S.C. § 103 over Tanabe et al., article, (Tanabe)

Claims 31-72 stand rejected under 35 U.S.C. § 102 as anticipated by or, in the alternative obvious under 35 U.S.C. § 103 over 4213956 (Tanabe.) Claims 31,and 61-72 have been amended in this reply. To the extent that this rejection may still apply to the amended claims, the rejection is respectfully traversed.

For the following reasons, this rejection is respectfully traversed.

The Tanabe article sets forth a proposal for research into the area defined as carbon alloys but does not indicate how to make carbon alloy products. It is respectfully submitted that Tanabe does not demonstrate that the invention of any such products was

in the passion of Tanabe at the time of the article. It was merely a proposal for research in part to see whether carbon alloys as defined might be developed. That is a little like a science fiction writer proposing that a vehicle might be developed to carry humans to another galaxy at a time when there is no such vehicle. This is not prior art that would anticipate or make obvious a specific product, namely a molded non-graphite carbon alloy as clamed by Applicants. For example, there is no mention of the specific structure of such a product in the article, such that a molded three-dimensional carbon alloy product produced defined by process as claimed by Applicants is not shown or suggested in the Tanabe article.

In view of the above, Tanabe fails to show or suggest the present invention as recited in the claims 31 and 61as amended. Thus, the claims 31 and 61as amended are patentable over Tanabe. Dependent claims are allowable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

In view of the above, all of the references cited and applied fails to show or suggest the present invention as recited in the claims as amended. Thus, the claims as amended are patentable over the references cited and applied. Dependent claims are allowable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Applicants believe this reply is fully responsive to all outstanding issues and places this application in condition for allowance. If this belief is incorrect, or other issues arise, the Examiner is encouraged to contact the undersigned or his associates at the telephone number listed below. Please apply any charges not covered, or any credits, to Deposit Account 50-0591 (Reference Number 17133/002002).

Dated: September 21, 2009

Respectfully submitted,

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